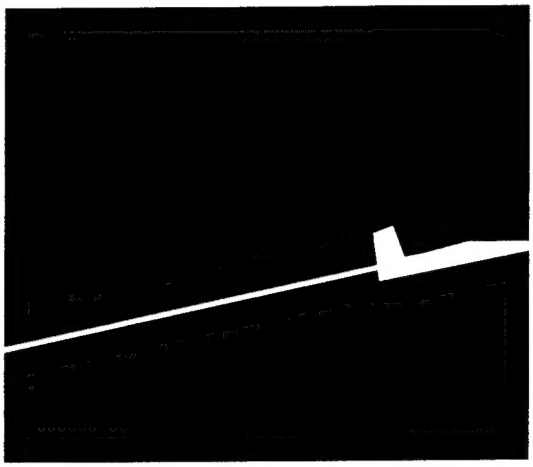

SIDAC

Supportability Investment Decision Analysis Center

Contract No. F33657-92-D-2055/0087
CDRL A007, Data Item DI-A-3024A
Report No. SID/MR-96/0095

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for

Army Logistics Assessment Program

Prepared for

HQ USA/DALO-RMI
500 Army Pentagon
Washington, DC 20310-0500

21 June 1996

Prepared by

Synergy, Inc.
1763 Columbia Rd. NW
Washington, DC 20009-2834

Submitted by

SIDAC
5100 Springfield Pike
Dayton, Ohio 45431

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1763 Columbia Rd, NW
Washington, DC 20009

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The proof-of-concept model for ALAP demonstrates the feasibility of equating Army measures of OPTEMPO, maintenance rates, and funding levels to sustainment capability. Synergy's ALAP shows that we can link weapon system readiness to sustainability given current and future programmed budget positions to create a viable POM and PPBES decision-support tool. This model also supports the hypothesized outcome of current funding levels affecting future capabilities to successfully prosecute combat missions and contingency operations.

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TABLE OF CONTENTS

Section	Title	Page
1	INTRODUCTION	1-1
	APPENDIX A: PEACETIME AND WARTIME MODELING	A-1
	APPENDIX B: ARMY LOGISTICS ASSESSMENT PROGRAM UPDATE	B-1
	APPENDIX C: PROPOSAL FOR PROGRAMMED DEPOT MAINTENANCE MODELING	C-1
	APPENDIX D: ARMY LOGISTICS ASSESSMENT PROGRAM UPDATE	D-1
	APPENDIX E: ARMY LOGISTICS ASSESSMENT PROGRAM TECHNICAL BRIEFING	E-1

SECTION 1
INTRODUCTION

The attached presentation materials contain the slide presentations of project reviews conducted for the development of the Army Logistics Assessment Program (ALAP).

APPENDIX A

PEACETIME AND WARTIME MODELING

SYNERGY

PEACETIME AND WARTIME MODELING

Jim Lutz
Ray Reed
Sean Trench
Mike Austin

JUNE 95

REQUIREMENT

THE ARMY NEEDS THE ABILITY TO PERFORM

PEACETIME AND WARTIME CAPABILITY ASSESSMENTS

BASED ON RESOURCE FUNDING FOR

CURRENT AND IN THE FUTURE (POM YEARS)

Synergy

BACKGROUND

ARMY Develops Peacetime & Wartime Requirements (Class IX)
- **Funding Applied During Budgetary Process**

Peacetime:
- **Funding Has Been Good But The Good Times May Be Short Lived**
- **DS/DS Inventories Plus Drawdown Have Reduced Anxieties**
- **However, The Army Needs A Predictive Assessment Tool**

SEAME/SPA Provide Capability to Assess Current + One Year

Gen (R) Thurman, On Meyer Readiness Task Force
- **Impressed With USAF Predictive Models (FAMMAS & WINLAM)**

Successful FAMMAS Prototype Developed
- **Provides Capability To Assess MC (NMCM + NMCS)**
- **Beginning Production Version (ECD: Sep 95)**

SEAME/SPA Plus FAMMAS Provides Capability to Assess Current + POM Years

Synergy

BACKGROUND cont.

Wartime:

- **Funding Has Not Been Adequate And The Assessment Capability Limited**
- **OSRAP Is A Good Assessment Tool But Limited To Current + One Year**

If The Balloon Goes Up Today, WRM Will Be Sourced From Peacetime Assets

- **Currently, There Are Enough Assets To Meet The Most Stringent Tasking**

However, Will There Be Enough Two or Three Years From Today

If The Current Philosophy Continues, "Do More With Less"

- **And You Lack The Ability To Assess The Impact Of Funding Shortfalls**
- **Then OSD/Congress Will Continue To Not Fund WRM**
- **Until The Army Develops A Capability To Show Impact**

The DOD Budget Is Usually A Zero Sum Game

- **Consequently, The Air Force Wins And Army Looses**
- **Because Air Force Can Demonstrate Impact (WINLAM)**

The Army Needs The Capability To Assess Current + POM Years

BACKGROUND cont.

OSRAP Is A Good Assessment Tool:

- **Determines Total (Class IX) Wartime Requirement (Current + POM)**
- **Assess Capability Of Current Stocks + Projected Buys (FY95/96)**

However, Can Not Assess POM Requirement (FY97-02)

- **No Procedure To Predict An Asset Position Beyond Current Buys**
- **No Ability To Assess Impact To Funding Shortfalls**

Need To Expand OSRAP To Assess POM Funding Impacts

PROPOSED SOLUTION

Peacetime Capability Assessment Tool:

- **Synergy Develop An Army FAMMAS (Predictive Assessment Tool)**
- **AMSAA Modifying OSRAP To Assess Current Asset Position**
- **AMSAA/Synergy Integrate Army FAMMAS Into OSRAP**

Wartime Capability Assessment Tool:

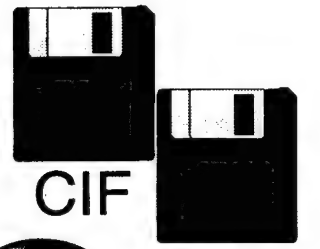
- **Synergy Develop A Wartime Predictive Assessment Capability**
- **AMSAA/Synergy Integrate This Capability Into OSRAP**

Enables OSRAPs Ability To Assess MC (NMCM + NMCS) For Current + POM

Synergy

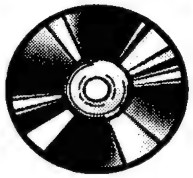
OSRAP ARCHITECTURE

OSRAP DATA SOURCE



CIF

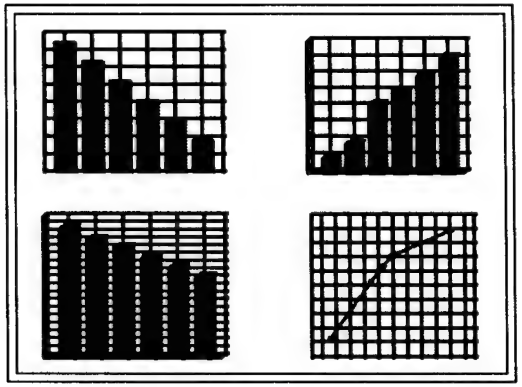
MPDL

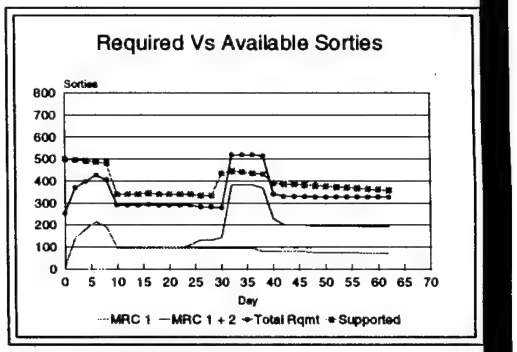


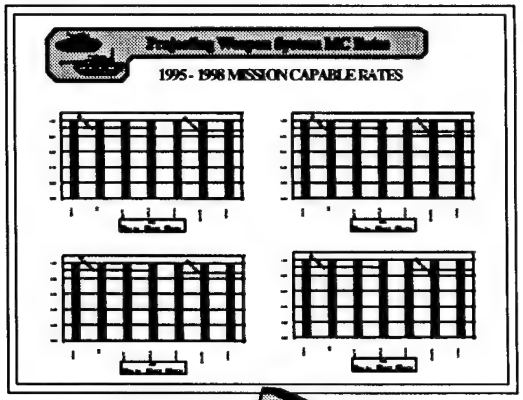
AMDF

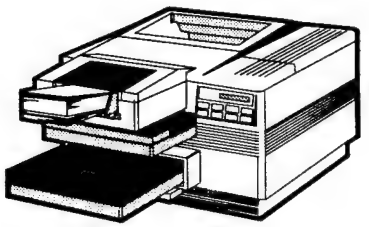
SYNERGY's Wartime Predictive Capability

GRAPHIC OUTPUTS









Synergy

A - 7

A - 7

FUTURE ENHANCEMENTS

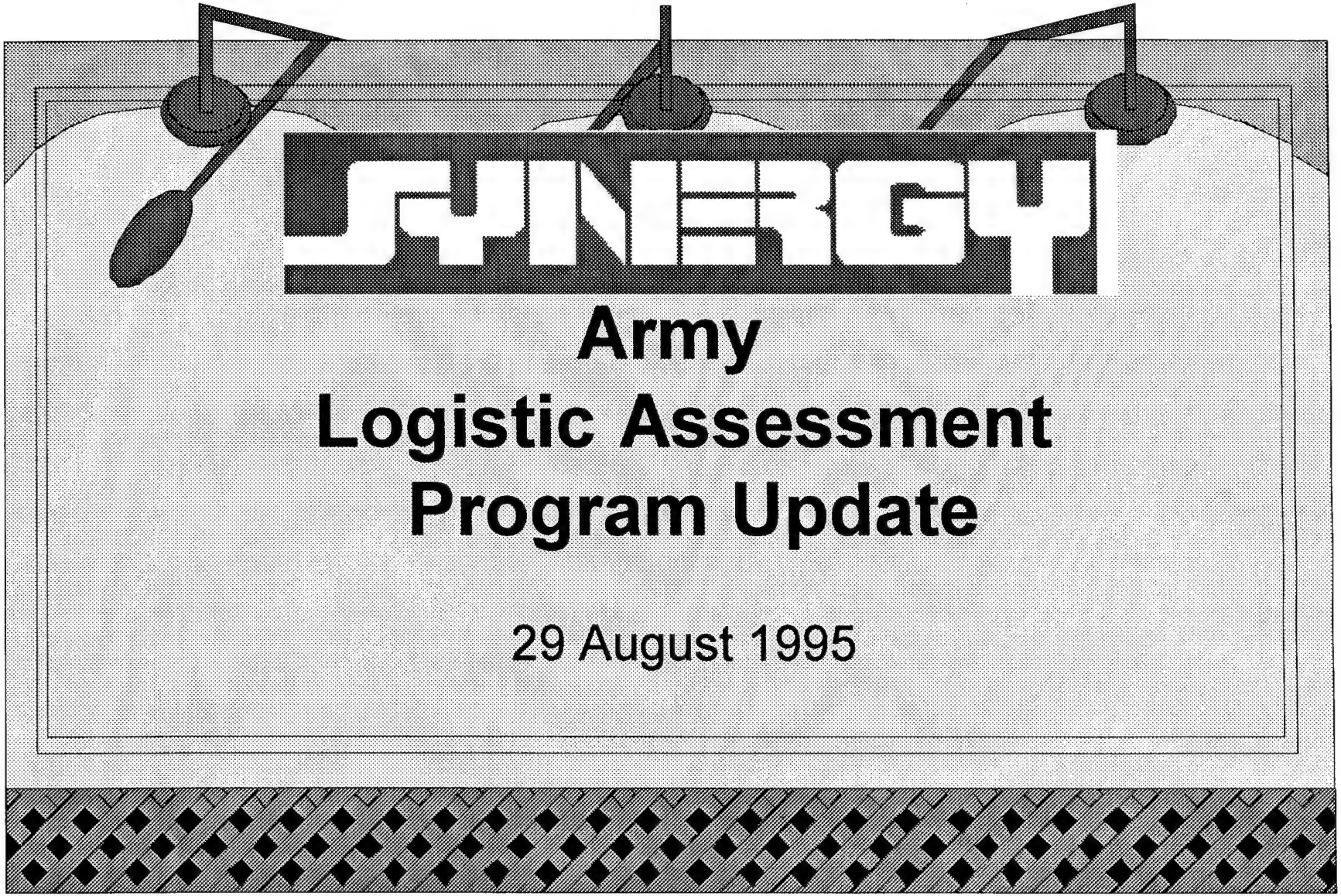
Make OSRAP An Even Better Tool:

- **Synergy Asked To Develop Methodology To Assess SE/Mods/Depot**
- **Synergy/AMSAA Integrate SE/Mods/Depot To OSRAP**
- **AMSAA Desires To Incorporate Other Classes Of Supply In OSRAP**

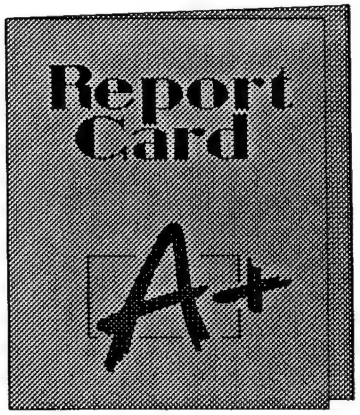
Synergy

APPENDIX B

ARMY LOGISTICS ASSESSMENT PROGRAM UPDATE

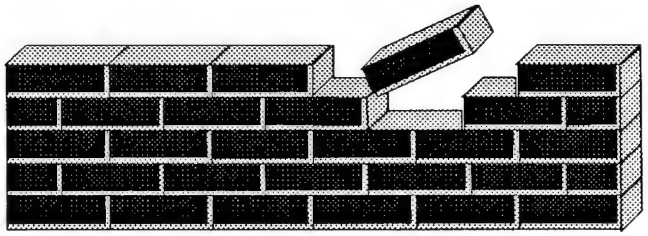

SYNERGY
Army
Logistic Assessment
Program Update
29 August 1995

Purpose



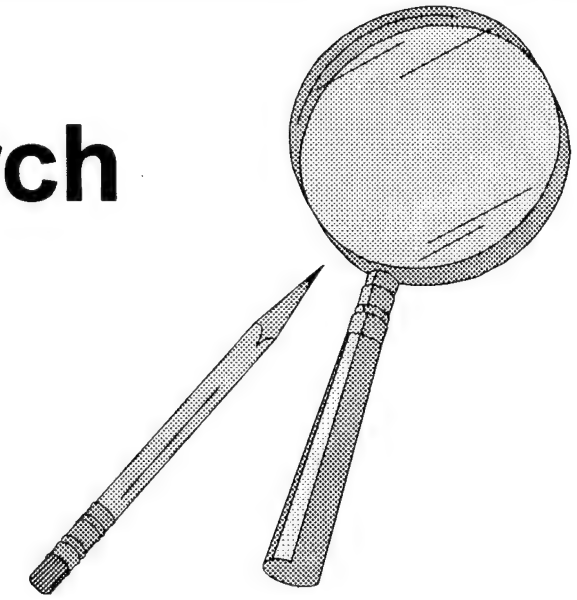
- **To provide an Update on the Current Status of the ALAP**
- **To Obtain a Consensus on the Direction of Effort for Work Under the ALAP Contract**

Current Work



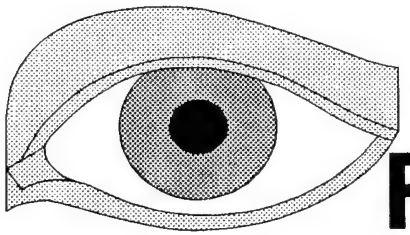
- Collect Wartime Data
- Address Sustainment/Contingency Issues and Tradeoff Analysis Among the 16 SORTS Weapon Systems
- Investigate Development of Wartime Version of FAMMAS

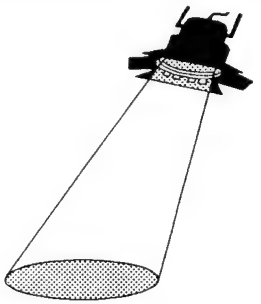
Research



OSRAP

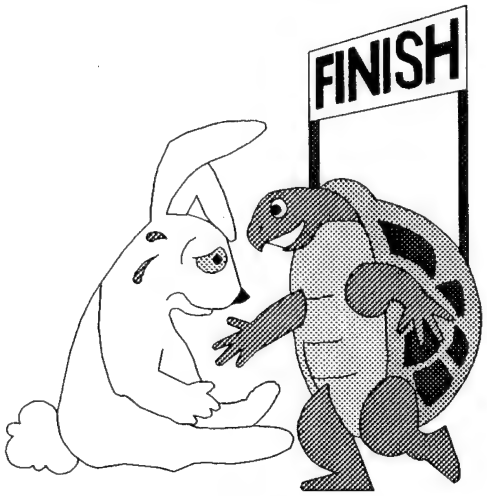
- Optimum Stockage Requirements Analysis Program
- Similar Input Requirements - Both Predict Weapon System Operational Availability
- OSRAP Fulfills AMC Sustainment Analysis Requirements





Refocus ALAP Effort Towards PDM Modeling

- Research
  - Issues
    - Trade-off Capabilities
    - O& S Cost
- Architecture Development
- Proof of Concept Model



Summary

- Synergy on Contract for work
- Original work planned no longer desired
- Alternative Projects identified and requested
- Synergy ready to refocus work effort
- Current Contract allows refocusing effort

Decision

- Work on PDM Modeling
- Continue Work as currently written
- Work with Key Players to ID other areas of interest

APPENDIX C

PROPOSAL FOR PROGRAMMED DEPOT MAINTENANCE MODELING

Background

- Synergy Proposed PDM Modeling for JDMAG
- PDM Modeling for Army suggested
- FAMMAS Statement of Work Modified to include PDM Factor in Weapon System Readiness
  - Modified FAMMAS account for average number of systems in depot
  - Missed Opportunity
- PDM modeling should be consistent with JDMAG proposal

SYNERGY

Approach to JDMAG Modeling Support of PDM

- Multi - Phase Effort
- Critically review completed phase to analyze justification for continuing

SYNERGY

Road Map for Army PDM Modeling

- Identify & Understand the Problem - Conduct Research and Analysis to uncover significant statistical indicators

- Relate PDM Budgets to Weapon System Readiness -

- Develop Proof of Concept Model

SYNERGY

APPENDIX D

ARMY LOGISTICS ASSESSMENT PROGRAM UPDATE

SYNERGY
Army
Logistic Assessment
Program Update
5 March 1995

SYNERGY

Army Logistic Assessment Program

Progress Review

Agenda

- Purpose
- Background
- Statement of Work
- The ALAP Contract Description
- Chronology of Events
- Contract Objective
- Synergy's Approach to Contract Completion
- Status
- Architecture
- Data Source
- Summary

SYNERGY

Purpose

- To Present an Historical Overview of Synergy's Army Logistic Assessment Program (ALAP) and efforts to complete the Project
- To Provide an In-Progress Update as of 5 March 1996
- To Preview the Projects Completion

SYNERGY

Background

FALL 1993:

- GEN(R) Thurman, on Meyer Readiness Task Force, Impressed with USAF FAMMAS
    - FAMMAS = Funding/Availability Multi-Method Allocator for Spares

DEC 1993:

- DCSLOG GEN. Salomon and DUSD (LOG) Mr. Klugh direct test on AH-64 Apache
    - Results were promising

SYNERGY

Background
Continued

JAN 9, 1994:

- Dr. Perry Memo added Momentum

FEB-MAR 1994:

- GEN Salomon directed testing on additional 3 Helicopter systems, Results Acceptable

APR 1994:

- DCSLOG GEN. Wilson directed test on M1A1 & Bradley Fighting Vehicle
    - FAMMAS successfully fitted to ground systems

SYNERGY

Background
Continued

MAY 1994:

- GEN Wilson directed test on all 16 Major SORTS systems
  - Including USMC M1A1 & HMMWV
- Completed initial testing on all 16 Major SORTS systems and results briefed up to Army Vice Chief of Staff level
- Synergy and DALO-RMI negotiate two (2) work efforts:
  - The first is to put FAMMAS in a Windows environment
  - The second is to enhance FAMMAS and conduct Wartime Logistic assessments

SYNERGY

Background
Why ALAP

- Army Logistic Analysis Program (ALAP) reasonable follow on and complement to FAMMAS
  - Assesses the sustainability of weapons systems in multiple MRC scenarios
  - POM tool to graphically to asses sustainability given a budget position
  - Provide total Peace-to-War Funding Scenario

SYNERGY

Statements of Work
Confusion - One Contract or Two

FAMMAS -

Purpose

"...Development of an Army Readiness Model. The model will assess peacetime readiness..."

Work To Be Accomplished

The contractor will design an Army FAMMAS model in a Windows environment. The model will be subject to a Preliminary Design Review (PDR) and a Critical Design Review (CDR). A Critical Design review will be held to finalize changes to the model.

ALAP -

Purpose

"...Development of an Army Readiness Model. The model will assess peacetime readiness..."

Work To Be Accomplished

Perform wartime logistic assessments. The contractor will...install a separate module within FAMMAS which enables the logistics community to assess the impact on system readiness caused by MODs, Depot Maintenance, and common support equipment (CSE)

Statements of Work
Confusion - One Contract or Two

FAMMAS -

Purpose

"...Development of an Army Readiness Model. The model will assess peacetime readiness..."

Deliverable

- Preliminary Design Review (PDR)
- Critical Design Review (CDR) Briefing
- Functional Description
- User's manual
- Software

ALAP -

Purpose

"...Development of an Army Readiness Model. The model will assess peacetime readiness..."

Deliverable

- Technical Report
- Briefing of Tech Report
- Update Functional Description,
- Update User's Manual
- FAMMAS Enhancement Software

Army Logistic Assessment Program

A Basic Description

- A Multi-Tasked Project
  - Enhancements to FAMMAS
  - Assess the Development of an Army Version WINLAM (Sustainment Model)
- WINLAM - A Decision Tool
  - Macro-level Budget Analyses
  - Quick assessments of programming and budgeting decision impact on Sustainment Capability

SYNERGY

Army Logistics Assessment Program (ALAP)

A Chronology of Events

- 16 Jan 95 - Contract dated
- Feb 95 - Work Begins
- Apr 95 - First Meeting with Principal Players At LOGSA
  - ALAP Briefed as Wartime Version of FAMMAS
  - AMSAA & AMC initial position - "No More Requirement Models" - OSRAP

SYNERGY

ALAP Vs OSRAP
A Chronology

(Round 1)

- Apr - May 95 - Data Research for ALAP Model Development Stops
- May 95 - OSRAP Fact finding begins
  - OSRAP - Stockage Requirement & Determination
  - ALAP - Wartime Sustainment, MC Predictive & Budget Decision
  - Similar Input Requirements

SYNERGY

ALAP
A Chronology

- Jun 95 - AMC assumes Project Oversight -
  - Briefed Findings of OSRAP Investigations to AMC
  - Model Development on hold until...
  - Synergy Turns efforts to FAMMAS Enhancement
  - Suggest other Tasks for ALAP Completion
    - Depot Maintenance Program
    - Integration of FAMMAS & OSRAP

SYNERGY

ALAP
A Chronology

- Jul 95 - Investigation and development of Programmed Depot Maintenance Model favorable to AMC
- Aug 95 - DALO-RMI reserves right to make decision on Project Alterations (Depot Maint Model on hold)
  - Request OSRAP briefing and demo
  - ALAP Model Development continues on hold

D-14

SYNERGY

ALAP
A Chronology

- Nov 95 - DALO-RMI gives "go-ahead" for completion of Proof-of-Concept Model
- Jan 96 - FAMMAS CDR/PDR
  - Personnel Changes within DALO-RMI
  - Reversal in thinking vis-a-vis Maintenance Module
  - ALAP Vs FAMMAS (Round 2 ?)

SYNERGY

Army Logistics Assessment Program

A Two Fold Objective

- Enhance FAMMAS by developing and Installing A Maintenance Module

- Investigate Possibility/Feasibility of producing A Wartime/Sustainment POM and Budget Assessment Decision Support Tool

SYNERGY

Army Logistics Assessment Program

A Two Fold Approach

- **FAMMAS** Maintenance Module -
  Identify key elements to NMCM reporting and replicate using available data Sources

- Sustainment Proof of Concept Model-
  - Research Army Wartime Logistic System
  - Research weapon system sustainment efforts
  - Identify and develop data sources
  - Replicate Logistic Sustainment System

SYNERGY

Army Logistics Assessment Program

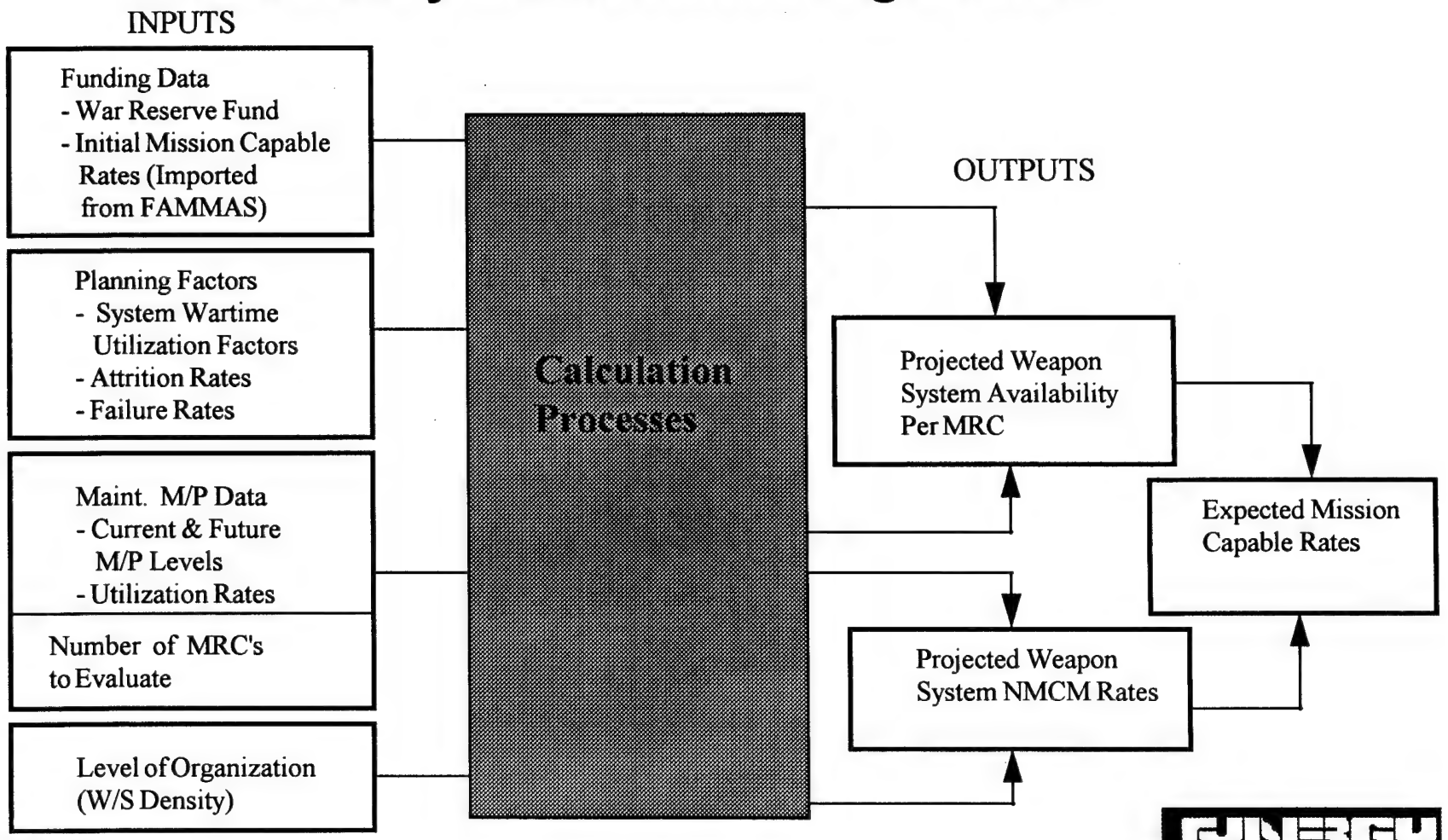
Status of Development

- **FAMMAS** Maintenance Module
  - Completed - Installed
- Sustainment Model
  - Models Architecture in Preliminary Development
  - Data Sources identified - 90% required data collected
  - Algorithms currently being developed

SYNERGY

Army Logistics Assessment Program

Preliminary Architecture/Logic Flow



Army Logistics Assessment Program

DATA	DATA SOURCE
Initial MC & NMC Rates	Army FAMMAS
Weapon System Density by Force Structure	TRAC-Lee/CASCOM Operations Logistics Planner
Combat OPTEMO	Concepts Analysis Agency
Current & Future Manpower Rates	Personnel Command MOSLS
Attrition Rates	LOGSA Candidate Item File
Break Rates	

SYNERGY

Army Logistics Assessment Program

SUMMARY

Initial Objective

Perform wartime logistic assessments.

The contractor will...install a separate module within FAMMAS which enables the logistics community to assess the impact on system readiness caused by MODs, Depot Maintenance, and common support equipment (CSE)

Revised Objective

Because of the many start and stop delays, confusion among all involved regarding Project Coordinator, FAMMAS/ALAP confusion, project goals

---

Technical Report and Briefing

A Proof of Concept Model

SYNERGY

APPENDIX E

ARMY LOGISTICS ASSESSMENT PROGRAM TECHNICAL BRIEFING

Army Logistic Assessment Program Technical Report

(Final Brief)

SYNERGY

Army Logistic Assessment Program

Agenda

- Purpose
- Background/History
- ALAP - The Introduction
- The New Old Project Goal
- The Basic Statement - A Building Block
- Original Architecture
- Final Architecture
- The Proof of Concept Model (POCM)
- Improvements
- Summary

SYNERGY

Army Logistic Assessment Program

Purpose

- To Provide Project Close-out Briefing
- To Report Project Analysis
- To Report POCM Prognosis
- To Explain/Demonstrate POCM

SYNERGY

Army Logistic Assessment Program

Do I Have to Listen to this again?

Background

FALL 1993:

- GEN(R) Thurman, on Meyer Readiness Task Force, Impressed with USAF FAMMAS

DEC 1993:

- DCSLOG GEN. Salomon and DUSD (LOG), Mr. Klugh direct test on AH-64 Apache - Results were promising

Army Logistic Assessment Program

Background

FEB-MAR 1994:

- GEN Salomon directed testing on additional 3 Helicopter systems, Results Acceptable

APR 1994:

- DCSLOG GEN. Wilson directed test on M1A1 & Bradley Fighting Vehicle - FAMMAS successfully fitted to ground systems

Army Logistic Assessment Program

Background

MAY 1994:

- GEN Wilson directed test on all 16 Major SORTS systems

- Synergy and DALO-RMI negotiate two (2) work efforts

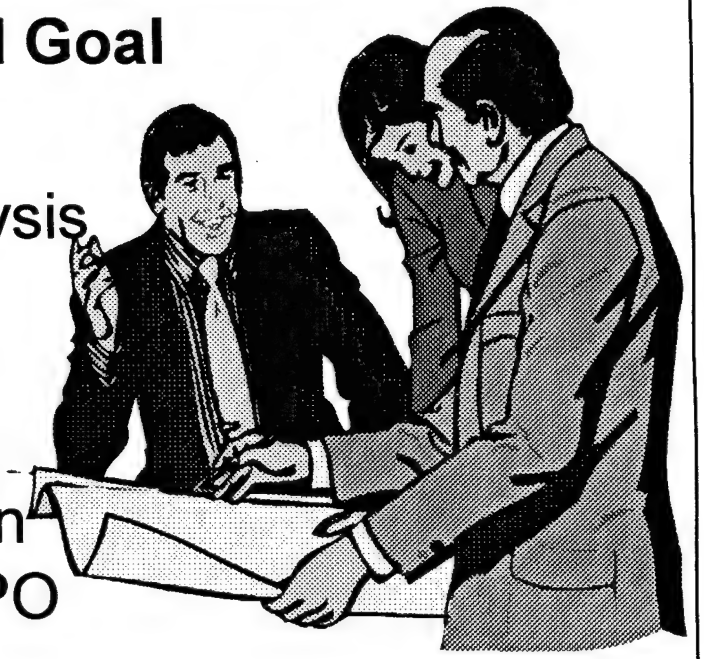
Army Logistic Assessment Program

Introduction To ALAP

- Wrong Introductory Brief
- Situation Warranted Decision Brief
- Initial Mistake Haunts ALAP to Completion

Army Logistic Assessment Program

New Decision, Old Goal

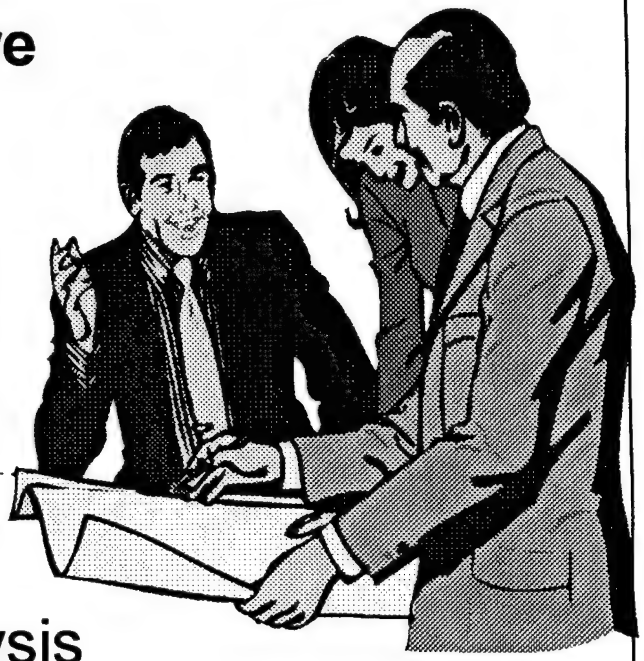


- Wartime Model - Sustainment Analysis Based on Funding Levels & Budget Posture

- Basic Statement - Model Foundation
  - Sustainment Linked to OPTEMPO
  - Link Army FAMMAS to Wartime Model

Army Logistic Assessment Program

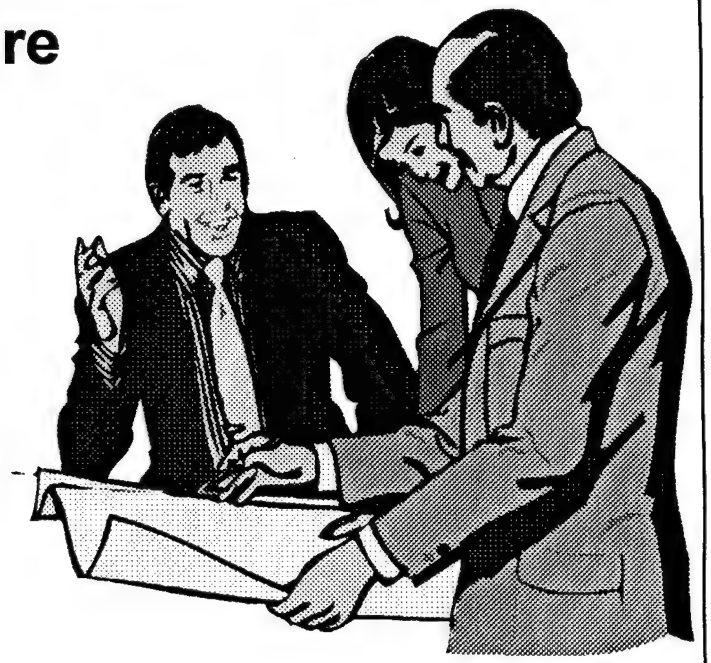
Original Architecture



- Model Combined Arms Sustainment Based on SRC Deployment
- Sustainment Capability Prediction Tied Base Year - Similar to Army FAMMAS
- Multiple OPTEMPO Sustainment Analysis
- MOSLS Data - Simulate Personnel & Equipment Attrition
- Resupply Simulation

Army Logistic Assessment Program

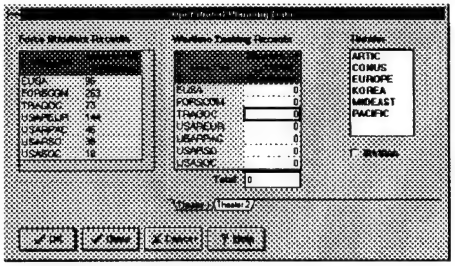
Final Architecture



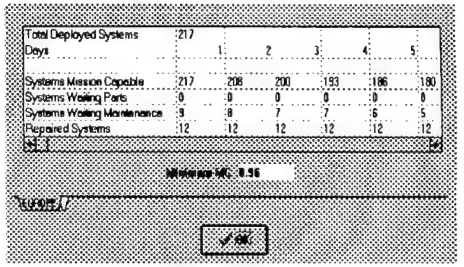
- Sustainment Analysis Based on Hours of Operation
- Single System Analysis
- 15 Day Scenario
- Randomized Attrition Rate
- Emphasis on Maintenance

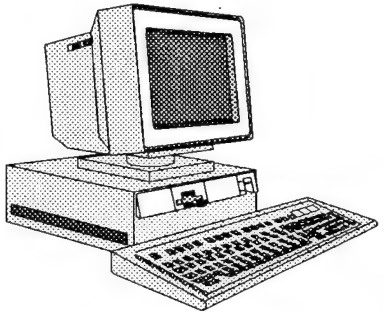
Army Logistic Assessment Program

Proof of Concept Model

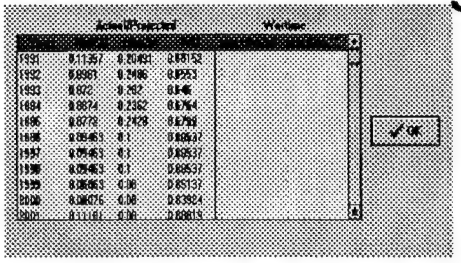


- Built on Army FAMMAS Foundation

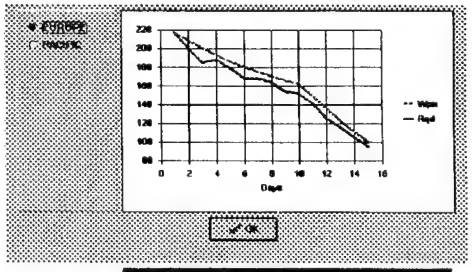




- Gives Weapon System Wartime Availability Based on Current Funding Levels



- Straight Forward Design Routine

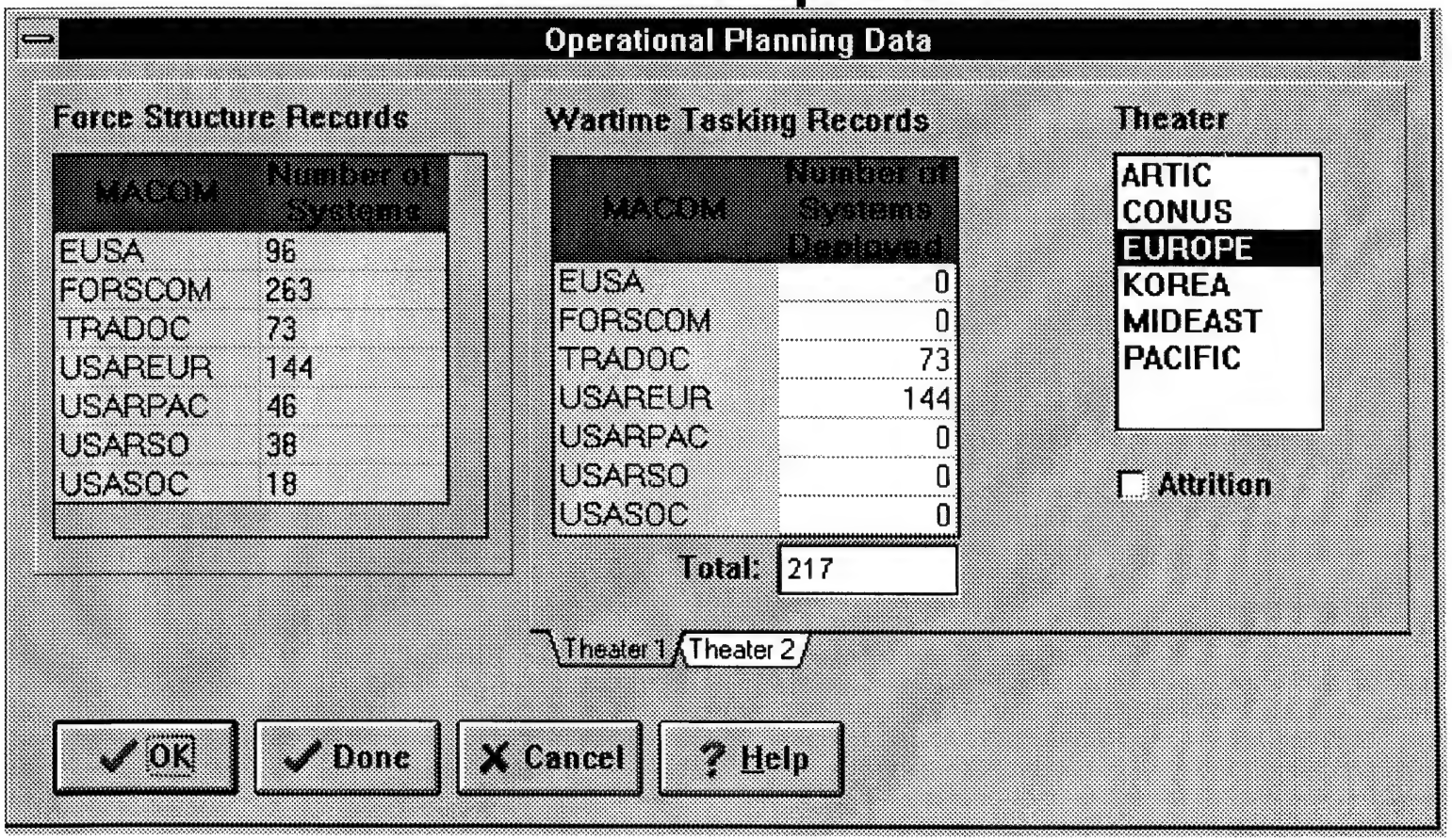


- Various Useful Calculation - Not All Configured as Output

E-11

Army Logistic Assessment Program

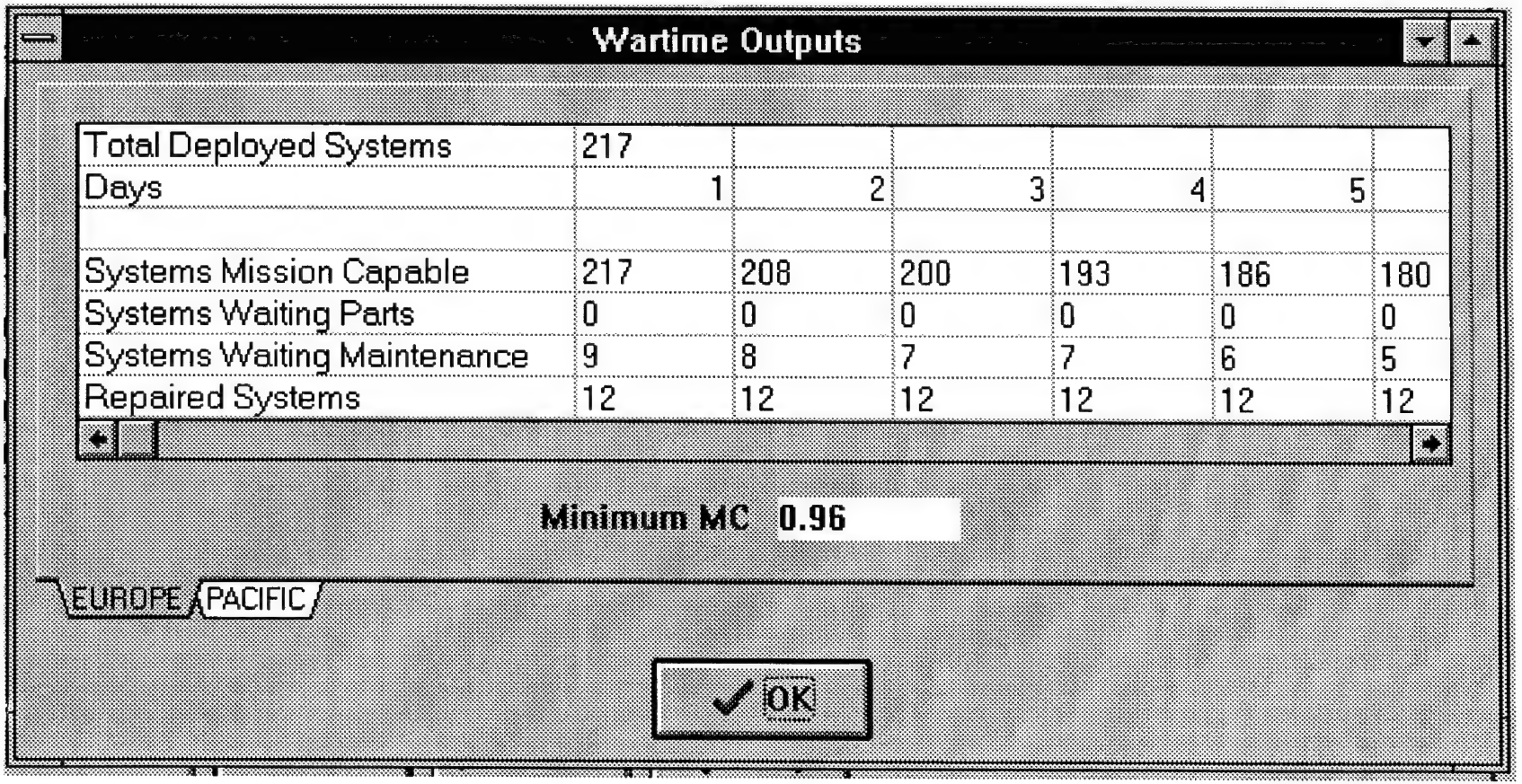
Proof of Concept Model



Input Screen

Army Logistic Assessment Program

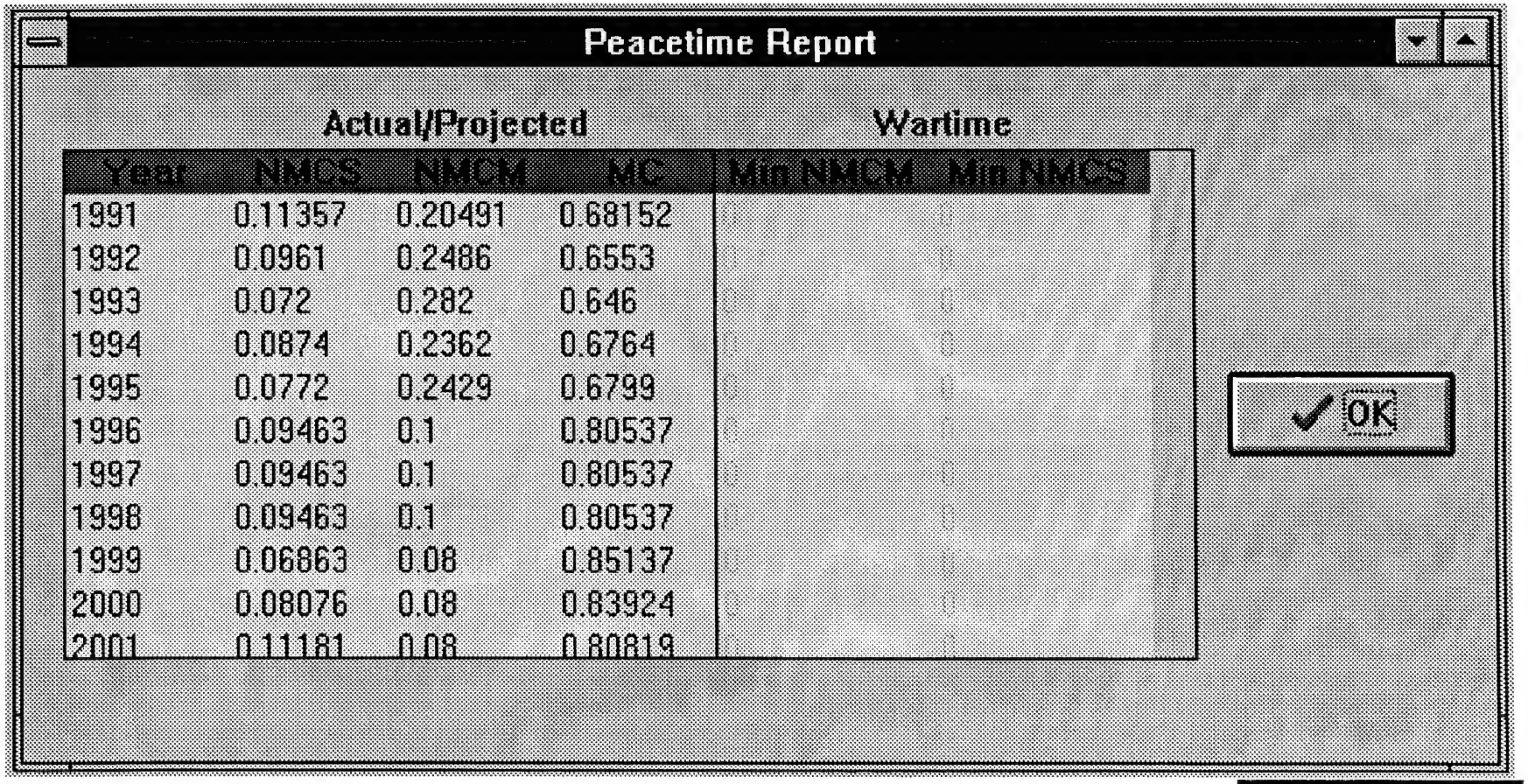
Proof of Concept Model



Analysis/Summary Screen

Army Logistic Assessment Program

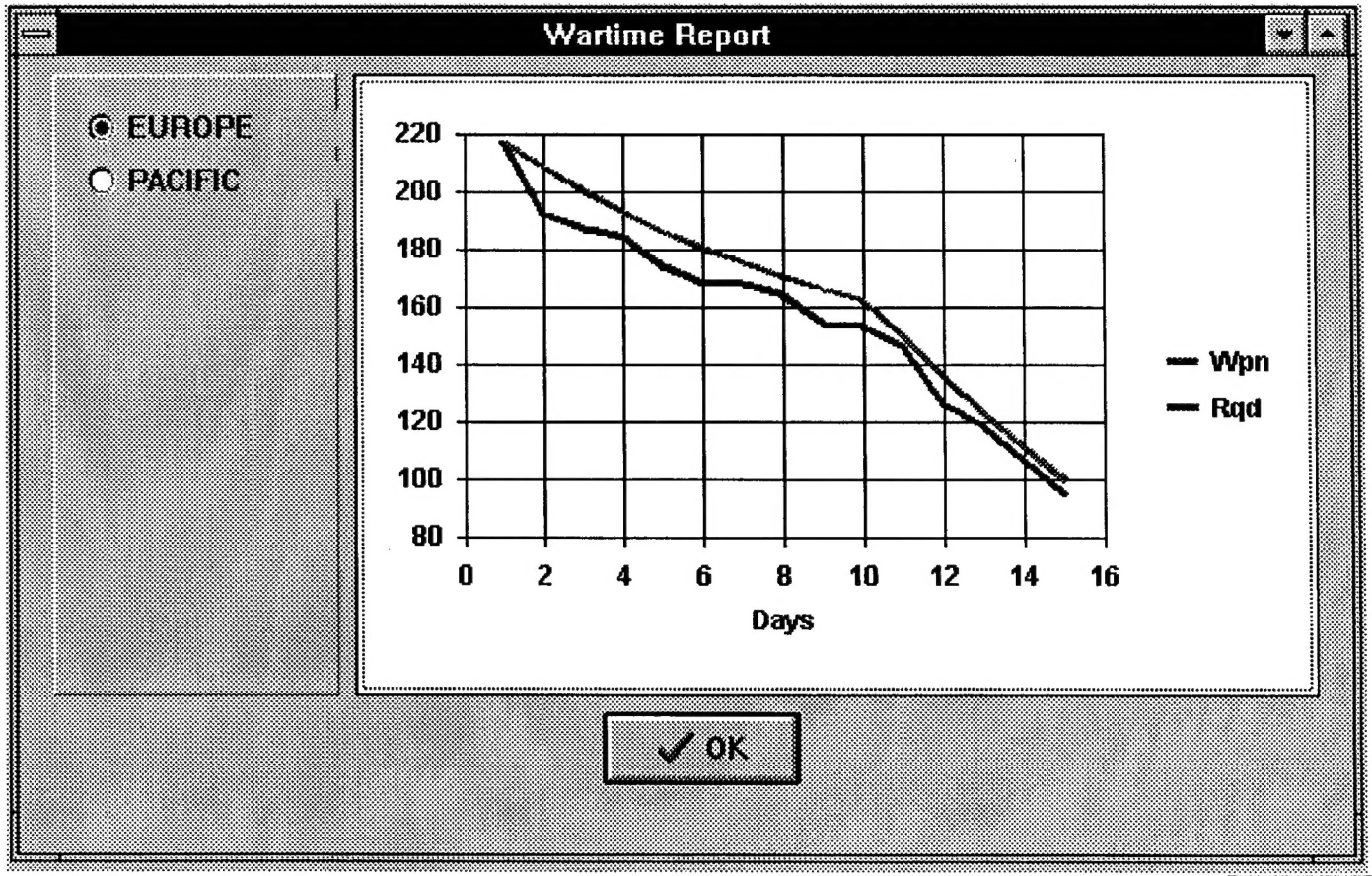
Proof of Concept Model



Output Screen - Peacetime Reports

Army Logistic Assessment Program

Proof of Concept Model

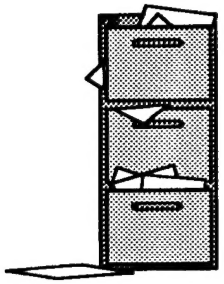


Output Screen - Wartime Reports

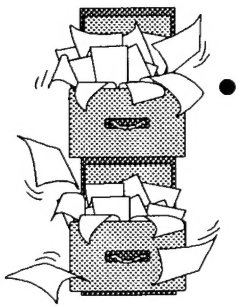
Army Logistic Assessment Program

POCM Data Input & Report Output

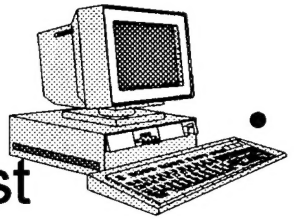
Input



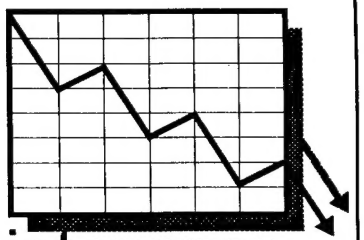
- Mission Profile Development List (TRADOC)-OPLOGPLN
- Candidate Item File (LOGSA)



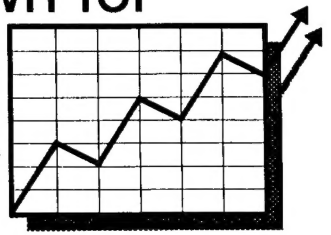
- Theater Wartime OPTEMPO (CAA) - OPLOGPLN



Output



- Systems MC
- Systems Down for Maintenance
- Systems Down for Supply



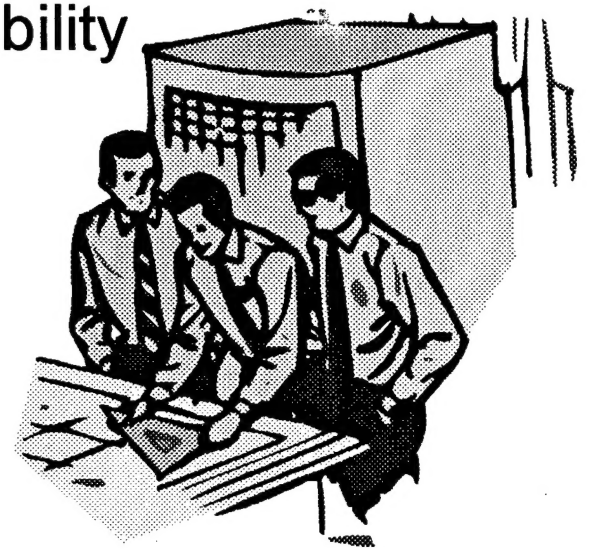
- # of Systems Brought Up Within 24 Hr Period
- Min Wartime MC Rate

SYNERGY

Army Logistic Assessment Program

Improvements/Work To Be Done

- Build Combined Arms Analysis Capability
- Add Multiple OPTEMPO Analysis
- Add Resupply Routine
- Add MOSLS Data
- Redesign (with User Input) Analysis Screen
- Integrate With OSRP



Army Logistic Assessment Program

Summary

- Concept Proved Viable
- Functionality Sacrificed Because of False Start
- Much Room For Improvement
- Expensive Lesson Learned